

Frequently Asked Questions about...

Environmental Cleaning and Disinfection

Q. In the healthcare setting, what does “environment” or “environmental surface” mean?

A. The environment refers to the patient’s surroundings. When we talk about cleaning the environment, typically we refer to cleaning and disinfecting objects, like housekeeping surfaces (e.g., floors, tabletops) and medical equipment. It is particularly important to focus on cleaning and disinfecting frequently touched items, such as bedrails, tray tables, IV poles, call buttons, monitor screens, controls and cables, pump controls, bedside tables, telephones, carts, toilets, bedpans, sinks, door knobs and levers, light switches, and faucet handles. See the link for a patient’s room and frequently touched surfaces (indicated with a red X) at http://www.apic.org/Content/NavigationMenu/PracticeGuidance/APICEliminationGuides/Figure_10.1.pdf.

Q. Why is it important to clean the environment?

A. Microorganisms (bacteria, fungi, viruses) are present throughout the environment and can cause infection. The environment can serve as a breeding ground for these organisms. Cleaning and disinfecting housekeeping surfaces and medical equipment, especially those that are frequently touched, is important to decrease and prevent the spread of these organisms to people.

Q. Does environmental cleaning and disinfection really work in preventing the spread of harmful microorganisms?

A. Yes. But how well it works depends on many things, including the nature of the object, the type, number, and location of microorganisms, how well the organisms resist the physical processes or disinfectants, the presence of organic and inorganic matter, the concentration and potency of disinfectant, other physical and chemical properties (i.e., temperature, pH), the duration of exposure, and the contact time. Remember that environmental cleaning and disinfection is just one of several steps needed to prevent the spread of germs.

Q. What is the difference between cleaning, disinfection, and sterilization?

A. There is a big difference among these terms.

Cleaning refers to the removal of visible soil and organic material (i.e., dirt, body fluids) from objects by washing or scrubbing with water and detergents or soaps and rinsing with water. Thorough cleaning is needed before disinfection or sterilization because organic material can decrease the effectiveness of those processes. A *detergent* is a cleaning agent that does not claim to kill microorganisms.

Disinfection refers to process of removing some or all microorganisms that can cause disease, except bacterial spores. There are three levels of disinfection, depending on how many organisms are removed: high, intermediate, and low. A *disinfectant* is a chemical or a physical agent (e.g. ultraviolet radiation) that kills microorganisms, but not bacterial spores. Disinfectants are also classified as high-level, intermediate-level, and low-level.

Sterilization refers to the complete elimination of all forms of microbial life including bacterial spores. Objects can be sterilized by physical processes (i.e., intense steam and pressure or dry heat) or by using certain chemicals.

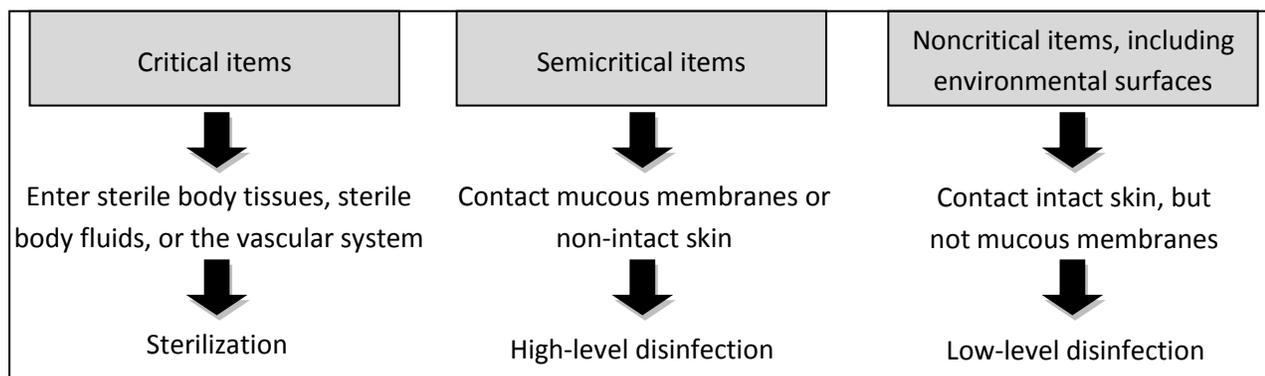
Q. How do you know which items should be cleaned, disinfected, or sterilized?

A. How medical equipment or environmental surfaces are cleaned, disinfected, or sterilized depends on the risk or chance of becoming infected with the item and the use of the item. In general, medical equipment and patient care items are divided into 3 main categories:

1) *Critical items* are items that enter normally sterile tissue or the vascular system or through which a sterile body fluid (e.g., blood) flows. These items are associated with high risk of infection if they are contaminated with any microorganism and must be sterilized before using. Examples include surgical instruments, cardiac and urinary catheters, and implants.

2) *Semicritical items* are items that contact mucous membranes (e.g., eyes, nose, or mouth) or non-intact skin. At a minimum, semicritical items require high-level disinfection using chemical disinfectants and rinsing with sterile water. Examples include respiratory therapy and anesthesia equipment, some endoscopes, cystoscopes, and laryngoscope blades.

3) *Noncritical items* are items that have contact with intact skin but not mucous membranes and are associated with little risk of spreading germs. Noncritical items require at least low-level disinfection. Noncritical patient care items include bedpans, blood pressure cuffs, blood glucometers, crutches, and computers. Noncritical environmental surfaces include bed rails, tray tables, bedside tables, walls, floors, toilets, sinks, and furniture.



Q. When should the environment be cleaned and disinfected?

A. Housekeeping surfaces (e.g., floors, table tops) and other environmental surfaces should be cleaned and disinfected regularly, when spills occur, and when these surfaces are visibly dirty. Follow your facility’s schedules for routine cleaning and disinfection and for terminal cleaning of rooms when preparing the room for the next patient. If you don’t have a schedule, you can make one using the example below. Medical equipment that is shared between patients (e.g., blood pressure cuffs) should be disinfected between patients.

Example of a Schedule for Low-Level Disinfection of Patient Equipment*

Equipment	Who is Responsible	Frequency	Cleaning Process
Blood pressure cuff	Nursing	Between patients	EPA-registered disinfectant
Call button	Environmental Services	Between patients	EPA-registered disinfectant
Bed side rails	Environmental Services	Daily	EPA-registered disinfectant

*Adapted from New York City Department of Mental Health and Hygiene, 2010, available at at http://www.nyc.gov/html/doh/downloads/pdf/bhpp/ped_ltcf_conf/peds_conf_clones.pdf .

Q. Which disinfectant should I use when disinfecting environmental surfaces?

A. Only use disinfectants registered with the U.S. Environmental Protection Agency (EPA). See <http://www.epa.gov/oppad001/active-hospital-disinf.pdf>. Remember to always follow the instructions on the product label. Pay close attention to the purposes indicated on the product label, the proper dilution rates (if

provided), the contact time required, the product shelf-life, and all safety instructions for handling and use. Do not mix cleaners and disinfectants unless the product label says that it is safe to do so.

Q. Can I use the same disinfectant for all situations?

A. No. There are special instructions for blood spills or when certain microorganisms (e.g., *Clostridium difficile* and norovirus) are known to be present.

Q. How long does the disinfectant need to come in contact with the surface?

A. Contact time refers to the amount of time needed for the chemical to come in contact with the microorganism so that a significant number of organisms are killed. The contact time will vary with the chemical being used. Many chemicals have a contact time of 10 minutes. This means that the surface that is being treated should stay wet after cleaning and disinfecting for 10 minutes.

Q. Can I use wipes to clean and disinfect?

A. If the surface is visibly dirty, it should be cleaned before being disinfected. If the surface is not visibly dirty, you can use a disinfecting wipe on the surface or equipment. It is important to pay close attention to the directions for the disinfecting wipe and the contact time needed to be effective. It may be necessary to use more than 1 wipe to keep the surface wet for the recommended contact time. If the surface is not kept wet for the appropriate amount of time to kill the microorganisms, it is possible to actually spread microorganisms with the wipe.

Q. What does “terminal cleaning” mean and when should it be performed?

A. “Terminal cleaning” refers to the cleaning and disinfection of a room after a patient is discharged or transferred. All surfaces that came in contact with the patient or that might have been contaminated during patient care should be cleaned and disinfected. This includes the frequently touched surfaces mentioned earlier. It also includes wiping down mattresses and headboards with an EPA-approved disinfectant, and removing privacy curtains, placing them in a bag in the room, and then taking them to the laundry facility for cleaning. For a checklist of items to clean and disinfect during terminal cleaning, visit the CDC website at <http://www.cdc.gov/HAI/toolkits/Environmental-Cleaning-Checklist-10-6-2010.pdf>

Q. What about cleaning up blood spills or spills of other potentially infectious material?

A. The following steps should be followed when cleaning up blood spills or spills of other potentially infectious material:

1. Always wear protective gloves and any other personal protective equipment that might be appropriate for the situation. For example, if sharps (e.g., needles, syringes, or scalpels) are involved, use forceps to pick up the sharps and place the sharps in a puncture-resistant container.
2. When disinfecting, use an EPA-registered antimicrobial product that has specific claims against HIV or hepatitis B virus (which includes EPA-approved products on Lists D and E at <http://www.epa.gov/oppad001/chemregindex.htm>) or use a freshly diluted sodium hypochlorite (bleach) solution. The bleach solution should be 1:100 for a small spill. If it is a large spill, use 1:10 dilution for the first application before cleaning (decontamination) and then use 1:100 for disinfection.
3. Clean the spill with disposable absorbent material and discard the contaminated materials into appropriate hazardous waste containers.

Q. What other microorganisms require special disinfectants?

A. When an outbreak of *Clostridium difficile* is suspected or confirmed, special instructions for cleaning and disinfection need to be followed. This is because the organism produces spores that can live in the environment for many months and these spores are highly resistant to cleaning and disinfection. During a suspected outbreak, first clean the area or objects (i.e., wash and scrub using a detergent). Then disinfect the area or

objects using a diluted bleach solution (1:10 dilution or 1 part bleach to 9 parts water that is prepared daily). A diluted bleach solution is recommended because no EPA-registered disinfectant is specific for inactivating *Clostridium difficile* spores. Allow a contact time of one minute by thoroughly wetting the surface with the diluted bleach solution and then allowing it to air dry.

When norovirus is suspected or confirmed, diluted bleach with a minimum concentration of 1:50 and a contact time of one minute is recommended. However, bleach is substantially and quickly inactivated in the presence of organic matter. In areas with high levels of soiling and resistant surfaces, a 1:10 diluted bleach solution and a contact time of up to 10 minutes may be necessary. Because these concentrations are much higher than is allowed for a no-rinse food contact surface sanitizer according to the FDA Food Code, if the area is a food contact area, this disinfection procedure must be followed by a clear-water rinse and a final wipe down with a sanitizing bleach solution of 1:200 to remove residual high levels of bleach.

Q. How do I make a diluted bleach solution?

A. Bleach is sold extremely concentrated and must be diluted to be used safely when disinfecting surfaces. If the bleach is diluted too much or not enough, then the diluted bleach solution may not be effective or it may be hazardous for the situation. The table below shows how to make diluted bleach solutions using household bleach and common measurement items. Household bleach is sold as 5.25% or 6.00%-6.15% sodium hypochlorite depending on the manufacturer. Note that a 1:10 dilution is the same as 1 part bleach to 9 parts water. A 1:100 dilution is the same as 1 part bleach to 99 parts water.

Bleach Solution	Dilution Exact	Chlorine (ppm)	Dilution (approximate)	Household (ppm) Approximate	Application*	Comments
5.25%-6.15%	Concentrate	52,500-61,500	Concentrate	52,500-61,500	Patient care	Not diluted: do <u>not</u> use without proper dilution
5.25%-6.15%	1:10	5,250 - 6,150	1 1/2 cups in 1 gallon water	~6000	Patient care	Use for porous surfaces, wooden floors
5.25%-6.15%	1:100	525-615	1/4 cup in 1 gallon water	~600	Patient care	Use for stainless steel, food/mouth contact items, toys
5.25%	1:200	263	1 tablespoon in 1 gallon water	<200	Dietary	
5.25%-6.15%	1:1000	53-62	1 teaspoon in 1 gallon water	~50	Dietary	

*Adapted from Premier Safety Share (2008). The glossary in the HICPAC Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008 provides bleach dilutions using household measurement terms and equivalent parts per million (ppm) that can be used to translate recommendations for use in the patient care setting for environmental decontamination after cleaning, e.g., for *Clostridium difficile*. The Safety Institute has expanded the information to include the use of chlorine bleach as a sanitizing agent in dietary settings consistent with EPA U.S Govt regulations (21 CFR Part 178).

Q. How should I store bleach?

- A. Open bottles of concentrated chlorine bleach will lose effectiveness after 30 days. Bottles should be changed every 30 days for accurate concentrations. Diluted bleach solutions should be prepared daily and any unused portions should be discarded. If diluted solutions cannot be made daily, they can be stored at room temperature for up to 30 days in an opaque plastic bottle. However, it is important to note that the stored solution will have a 50% decrease in concentration after 30 days of storage.

Q. What else should I know about bleach?

- A. Use non-scented bleach to maximize the chlorine concentration. Do not mix bleach with other cleaning agents (e.g., acids such as vinegar, or ammonia products such as Windex®). Potential irritants released from such mixtures are chlorine gas, chloramines, and ammonia gas. Chlorine bleach might damage fabrics and other surfaces. Spot test an area to be cleaned before applying to visible surface. Use only in well-ventilated areas.

Q. How do I protect myself when cleaning or disinfecting?

- A. An employee might need to wear special clothing or equipment to protect him or herself while cleaning and disinfecting. This specialized clothing and equipment is called personal protective equipment or PPE. PPE protects the employee from microorganisms and chemicals being used that could enter the body through the lungs, skin, eye, nose, or mouth. The exact PPE needed for cleaning and disinfection depends on the microorganism, the chemical being used, and the length of exposure to these agents. PPE can include gloves, gowns, mask, and eye protection. At a minimum, protective gloves are usually recommended for cleaning and disinfection.

Q. Where can I get more information?

- A. Contact your local health department if you have additional questions about environmental cleaning. References for this VDH fact sheet and additional information can be found at sites listed below.

Healthcare Infection Control Practices Advisory Committee (HICPAC) Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008. Available at http://cdc.gov/hicpac/pdf/guidelines/Disinfection_Nov_2008.pdf

Association for Professionals in Infection Control and Epidemiology (APIC) Guidelines for elimination of specific pathogens, including *Clostridium difficile*. Available at http://www.apic.org/AM/Template.cfm?Section=APIC_Elimination_Guides&Template=/CM/HTMLDisplay.cfm&ContentID=14632

Premier Safety Share, Bulletin: CDC releases 2008 Guidelines for disinfection and sterilization. Bleach dilutions clarified with household measurement terms, November 24, 2008. Available at http://www.premierinc.com/quality-safety/tools-services/safety/pSS/Bulletin_CDCGuide-11202008.htm